

K.L.N. COLLEGE OF ENGINEERING

Pottapalayam – 630 612, Sivagangai District

(An Autonomous Institution, Affiliated to Anna University, Chennai)



Estd: 1994

FIRST YEAR CURRICULUM AND SYLLABUS

REGULATIONS 2020

For Under Graduate Program

B.E. – ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

**(For the students admitted from the academic year 2020-2021
onwards)**



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VISION OF THE INSTITUTION

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

MISSION OF THE INSTITUTION

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

VISION OF THE DEPARTMENT

To promote as a center of excellence in educational and research activities related to electronics and communication engineering and its allied areas.

MISSION OF THE DEPARTMENT

- To create educational and research environment to meet ever changing and ever demanding needs of electronics and communication industry along with IT and other interdisciplinary fields.
- To mould the students to become ethically upright and recognized as responsible engineers.



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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO 1** To prepare graduates with a strong foundation in Engineering science and Technology with more emphasis in Electronics and Communication Engineering and its allied areas.
- PEO 2** To prepare the students to pursue successful career in industry and to motivate them for higher education.
- PEO 3** PEO 3.To prepare the graduates to sustain as good professional, researcher and to practice them in emerging technologies through lifelong learning.
- PEO 4** PEO 4.To impart students with ethical standards, professional excellence through effective communication skills, team work, multi-disciplinary projects and social responsibility.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- PSO 1** PSO 1.Apply the fundamental knowledge of mathematics, engineering science to identify, formulate, research and solve electronics and communication engineering problems in the areas of antenna design, embedded systems, image processing, VLSI design, wireless communication systems and sensor networks.
- PSO 2** Design of analog and digital electronic circuits by using modern engineering and computing tools and develop a system component to meet specific needs by considering public health, safety, societal and environmental issues.
- PSO 3** Apply ethical issues, social environmental impact and managerial skills to serve the society and communicate the engineering activities effectively to engineering community.



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PO1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management And Finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



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B.E. – ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

CATEGORY OF COURSES

- i. **Humanities and Social Sciences (HS) Courses** include Technical English, Environmental Science and Engineering, Engineering Ethics and human values, Communication Skills and Management courses.
- ii. **Basic Sciences (BS) Courses** include Mathematics, Physics, and Chemistry.
- iii. **Engineering Sciences (ES) Courses** include Engineering Practices, Engineering Graphics, Basics of Electrical / Electronics / Mechanical / Computer Engineering / Instrumentation etc.
- iv. **Professional Core (PC) Courses** include the core courses relevant to the chosen programme of study.
- v. **Professional Elective (PE) Courses** include the elective courses relevant to the chosen programme of study.
- vi. **Open Elective (OE) Courses** include courses from other departments which a student can choose from the list specified in the curriculum of the students B.E. / B.Tech. Programmes.
- vii. **Employability Enhancement Courses (EEC)** include Project Work and/or Internship, Seminar, Professional Practices, Case Study and Industrial/Practical Training.
- viii. **Mandatory Courses (MC)** include Personality and Character development and the courses recommended by the regulatory bodies such as AICTE, UGC, etc

SEMESTER I

(Common to all B.E./B.Tech Programmes)

S. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	20HS101	English for Technical Communication	HS	3	3	0	0	3
2	20BS101	Fundamentals of Engineering Mathematics	BS	4	3	1	0	4
3	20BS102	Engineering Physics	BS	3	3	0	0	3
4	20BS103	Engineering Chemistry	BS	3	3	0	0	3
5	20GE101	Problem Solving using Python Programming	ES	3	3	0	0	3
PRACTICAL								
6	20BS1L1	Basic Science Laboratory	BS	3	0	0	3	1.5
7	20GE1L1	Python Programming Laboratory	ES	4	0	0	4	2
8	20GE1L2	Industrial Practices Workshop	ES	3	0	0	3	1.5
TOTAL				26	15	1	10	21

SEMESTER II

B.E - Department of Electronics and Communication Engineering

S. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	20HS201	Advanced Technical Communication (Common to all B.E./B.Tech programmes)	HS	3	3	0	0	3
2	20BS201	Laplace Transform and Advanced Calculus (Common to all B.E./B.Tech programmes)	BS	4	3	1	0	4
3	20BS203	Physics for Electronics Engineering (Common to B.E. EEE, B.E. ECE and B.E. EIE programmes)	BS	3	3	0	0	3
4	20EC201	Network Analysis	PC	4	3	1	0	4
5	20GE201	Engineering Graphics (Common to all B.E./B.Tech programmes)	ES	4	2	0	2	3
6	20GE204	Basic Electrical Engineering and Electron Devices	ES	3	3	0	0	3
PRACTICAL								
7	20GE2L2	Unix and Shell Scripting Laboratory	ES	3	1	0	2	2
8	20EC2L1	Circuits and Devices Laboratory	PC	4	0	0	4	2
TOTAL				28	18	2	8	24

20HS101	ENGLISH FOR TECHNICAL COMMUNICATION	L	T	P	C
		3	0	0	3

OBJECTIVES:

- This course is designed for entry level Engineering and Technology curriculum enabling the students to learn, acquire and apply for their learning and career.
- The course is aimed at providing effective skills for promoting communication skills through English.
- Students will benefit in conversing with the peers, faculty and fellow professionals.
- The outcome of this course contains refined level of English proficiency by acquiring all four skills, listening, speaking, reading and writing to prepare them for global readiness.

PRE-REQUISITE:

Course Code: Nil
 Course Name: Nil

UNIT - I FOCUSING LANGUAGE DEVELOPMENT 9

Listening: Listening to TV News, Guest Lecturers, Note – taking. **Speaking:** Pronunciation Common Vocabulary – Technical Vocabulary – Answering Peer Questions – Conversation with Teacher. **Reading:** News magazines, Reading for unfamiliar words, Variety of News Items. **Writing:** Word formation – Auxiliary verbs – Modal Verbs – Sentence Types – Affirmative, Negative, Interrogative, Concord – Dialogue Writing, Letter to Principal / Director – Instructions using Auxiliary

UNIT - II GRAMMAR AND TECHNICAL READING 9

Listening: Listening to Peer Conversations – Brief Speeches – Listening for Specific Information – Recap of Speeches. **Speaking:** Wh Questions, Day today conversations, Telephonic enquiries official/formal enquiries. **Reading:** Technical Essays – Identifying Sentence Types – Classifying the verb patterns. **Writing:** Tenses – Simple Present, Present Progressive, Present Perfect, Present Perfect Continuous – Voice – Active & Passive – Précis Writing – Essay Writing

UNIT - III GRAMMAR AND LANGUAGE DEVELOPMENT 9

Listening: TV interviews, Commentaries, Digital Videos for World Information. **Speaking:** Telephonic Conversation – Classroom Activities – Conversing Information. **Reading:** Coherence, Development of Thoughts. **Writing:** Tenses – Simple Past, Past Progressive, Past Perfect, Past perfect continuous – Impersonal Passive-Narrating the past events, Letter to friend/father about Industrial Visit/Functions held – Narrating the past experience using Impersonal Passive voice

UNIT - IV READING AND LANGUAGE DEVELOPMENT 9

Listening: Listening to Dialects of English – British & American Regional. **Speaking:** Role Plays, Extempore, Responding to specific questions. **Reading:** Comprehensive passages, Reading for specific points. **Writing:** Tenses – Simple Future, Future progressive, Future Perfect, Future Perfect continuous – Definition – Phrases of Reason – Cause & Effect, Recommendations, Argumentative Essays, Letter to the Editor on Social Issues – Analytical Essays on Social hazards using Cause and Effect.

UNIT - V EXTENDED WRITING 9

Listening: Listening to Technical Seminar speeches – Listening to achievers, eminent personalities – Dialects – Australian – African – Asian. **Speaking:** Welcome address, Compeering, Vote of Thanks, Peer debates. **Reading:** Texts on self-confidence, motivation, success path. **Writing:** Contracted forms, Conditionals, Articles, Preposition, Tense – ‘going to’ - Error Spotting, Sequence Words – Rearranging – Writing a Book Review – Summary writing – Rearranging Sentences using Sequence Words, Note Making

TOTAL: 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Listen, Comprehend and Correspond with others at various contexts
- Speak legibly and fluently under various life-time situations by applying proper communication modules.
- Read and understand a variety of writings and technical text by analyzing the meaning and language.
- Apply clear and legible writing skills in error free style in coherent manner
- Remember and use various communicative skills in precise and efficient way on technological contexts
- Form situational conversations and technical writing styles for interpersonal and effective communication

TEXT BOOKS:

1. Board of Editors. “Using English A Course book for Undergraduate Engineers and Technologists”. Orient Black Swan Limited, Hyderabad: 2015
2. Richards, C. Jack. “Interchange Students’ Book-2”, New Delhi: CUP, 2015.

REFERENCES:

1. Murphy, Raymond “English Grammar in Use with Answers: Reference and Practice for Intermediate Students”, Cambridge: CUP, 2004
2. Thomson, A.J. and Martinet, A.V. “A Practical English Grammar”, OUP, New Delhi: 1986
Anne Laws, “Writing Skills”, Orient Black Swan, Hyderabad, 2011
3. Board of Editor, “English for Technical Communication”, Great Mind Publication, Chennai : 2018

20BS101	FUNDAMENTALS OF ENGINEERING MATHEMATICS	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To relate various methods of Matrix Algebra to handle practical problems arising in the field of engineering.
- The main aim of this course is to achieve conceptual understanding and to retain the best traditions of Calculus.
- The syllabus is designed to provide the basic tools of Calculus of Single and Multivariable, mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT - I MATRICES 12

Introduction to Matrices-Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a Quadratic form to Canonical form by Orthogonal transformation – Nature of Quadratic forms.

UNIT - II DIFFERENTIAL CALCULUS 12

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Differentiation of Polynomials, Exponential, Trigonometric, Hyperbolic, Logarithmic and Implicit functions- Maxima and Minima of functions of single variable.

UNIT – III FUNCTIONS OF SEVERAL VARIABLES 12

Partial differentiation – Homogeneous functions and Euler’s theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables – Maxima and Minima of functions of two variables – Lagrange’s method of undetermined multipliers.

UNIT – IV INTEGRAL CALCULUS 12

Definite and Indefinite integrals - Substitution rule - Techniques of integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions, Improper integrals.

UNIT – V ORDINARY DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

TOTAL: 60 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Find the Eigen values and Eigen vectors to diagonalize a matrix, reduce quadratic form to canonical form.
- Apply the concept of limits, continuity and rules of differentiation to differentiate some standard functions and apply the techniques of differentiation to differentiate various types of functions.
- Understand the concepts of Concavity and Convexity by finding the Critical points, point of Inflection and to find Maxima and Minima functions of Single variable.
- Find the derivatives of functions of two variables and apply them to calculate the maxima and minima.
- Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
- Apply various techniques to solve higher order differential equations with constant and variable coefficients.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2017.
2. T. Veerarajan., "Engineering Mathematics I", The Tata Mc Graw Hill Publication-New Delhi, First Edition, 2018

REFERENCES:

1. James Stewart, "Calculus, Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015. [For units II & III].
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2006.
3. Wiley, "Calculus- International Student version", 10th Edition, Wiley India Pvt. Ltd, New Delhi 2017.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
5. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics II", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 9th Edition, 2014.

20BS102

ENGINEERING PHYSICS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To inculcate the fundamental knowledge in properties of matter and crystal physics.
- To enrich the knowledge on Laser, fiber optics and ultrasonics and their applications relevant to various streams of Engineering and Technology.
- To introduce quantum physics and its applications.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT - I PROPERTIES OF MATTER 9

Elasticity – Hooke’s Law – Stress-strain diagram and its uses – Three modulus of elasticity (qualitative) – Poisson’s ratio – factors affecting elastic modulus and tensile strength – twisting couple – torsional pendulum: theory and experiment – bending of beams – bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment – I -shaped girders.

UNIT - II LASER AND FIBER OPTICS 9

Lasers: Interaction of radiation with atomic energy states – Einstein’s A and B coefficients derivation – Population inversion – resonant cavity, optical amplification (qualitative) – solid state lasers – Nd:YAG laser, Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle – types of optical fibers (material, refractive index, mode) – losses associated with optical fibers – fiber optic sensors: pressure and displacement sensor.

UNIT - III ULTRASONICS 9

Ultrasonics – classification (qualitative) – properties – generation – magnetostriction and piezoelectric methods – detection of ultrasound – cavitations – velocity measurement – acoustic grating – Industrial applications (Drilling, Welding, Soldering and Cleaning) – SONAR – NDT – Pulse Echo system through Transmission and Reflection modes – A, B and C scan displays - Medical application – sonogram.

UNIT - IV QUANTUM PHYSICS 9

Black body radiation – Planck’s theory (derivation) – Compton effect: theory and experimental verification – wave particle duality – wave function and its physical significance – Schrödinger’s wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box – tunneling (qualitative) – scanning tunneling microscope.

UNIT - V CRYSTAL PHYSICS

9

Crystalline and amorphous materials – unit cell, crystal systems, Bravais lattices, lattice planes - Miller indices – Inter planar spacing in cubic lattice – coordination number and packing factor for SC, BCC, FCC, HCP structures – growth of single crystals: solution and melt growth techniques – Mechanisms of plastic deformation, slip and twinning.

TOTAL: 45 PERIODS**OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

- Demonstrate the properties of elasticity and measure the different moduli of elasticity.
- Examine the characteristics of laser and optical fiber
- Apply the concepts of ultrasonics in engineering
- Explain black body radiation, properties of matter waves and Schrodinger equation
- Classify the Bravais lattices and different types of crystal structures
- Gain information on growth of crystals and deformations

TEXT BOOKS:

1. R. K. Gaur and S. L. Gupta, "Engineering Physics", Dhanpat Rai Publications, 2012.
2. B. K. Pandey and S. Chaturvedi, "Engineering Physics", Cengage Learning India, 2018.
3. V.Rajendran, "Engineering Physics", Tata McGraw Hill Education Private Limited, 2011.

REFERENCES:

1. D.Halliday, R. Resnick and J. Walker, "Principles of Physics", Wiley publisher, 10th Edition, 2015.
2. R.A.Serway and J.W. Jewett, "Physics for Scientists and Engineers", Cengage Learning, 2014.
3. P.A.Tipler and G. Mosca, "Physics for Scientists and Engineers with Modern Physics", W.H.Freeman, 2007.
4. D.K.Bhattacharya and T. Poonam, "Engineering Physics", Oxford University Press, 2017.

20BS103

ENGINEERING CHEMISTRY

L	T	P	C
3	0	0	3

OBJECTIVES:

- To make the students, familiar with boiler feed water requirements, related problems and water treatment techniques.
- To learn the principle of electrochemical cell, types of corrosion and its control.
- To develop an understanding of the basic concepts of phase rule and its applications to one and two component systems and appreciate the purpose and significance of alloys.
- To be familiar with different types of fuel and their characteristics and also functioning of energy storage devices.
- To understand the techniques of spectra and chromatography for analytical purpose.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT - I WATER AND ITS TREATMENT 9

Characteristics of water; Hard water, Soft water, difference; Hardness – types of hardness, expression of hardness, units, removal of hardness (boiling, soda lime process), estimation of hardness of water by EDTA method (problems); Boiler feed water – requirements – disadvantages of using hard water in boilers (scale and sludge, priming and foaming, caustic embrittlement, boiler corrosion); Treatment of boiler feed water – internal treatment (carbonate, phosphate, and calgon conditioning) external treatment – ion exchange process, zeolite process; Purification of water - reverse osmosis, electro dialysis, Application of nanomaterials in water purification.

UNIT - II ELECTROCHEMISTRY AND CORROSION 9

Electrochemical cell - redox reaction, electrode potential- origin of electrode potential-oxidation potential- reduction potential, - electrochemical series and its significance - Nernst equation (derivation and problems).Corrosion- causes- factors, electrochemical corrosion (galvanic, differential aeration), corrosion control - material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method – corrosion inhibitors. Metallic coating – Electroplating – Factors - Electroplating of Copper and Electroless plating of Nickel.

UNIT - III PHASE RULE AND ALLOYS 9

Phase rule - introduction, definition of terms with examples; One component system - water system; Reduced phase rule - two component system, classification, lead-silver system; Alloys – introduction, definition, properties of alloys, significance of alloying; Functions and effects of alloying elements; Heat treatment of steel - annealing, hardening, tempering, carburizing, nitriding; Ferrous alloys- nichrome and stainless steel (18/8); Non-ferrous alloys – brass and bronze.

UNIT - IV FUELS AND BATTERIES**9**

Fuels – classification, characteristics; Petrol – characteristics, knocking, octane number; Diesel – characteristics, cetane number; Natural gas (CNG), LPG, Power alcohol, Biodiesel, Gasohol; Combustion of fuels – calorific value, GCV and NCV (Problems), calculation of theoretical air for combustion (Problems), Ignition temperature, explosive range, flue gas analysis (Orsat apparatus); Batteries – primary and secondary batteries, lead-acid battery, lithium ion battery, Fuel cell (hydrogen oxygen fuel cell).

UNIT - V ANALYTICAL TECHNIQUES**9**

Spectroscopic techniques – UV-visible (Principle and Instrumentation – Block Diagram only and applications), IR (Principle and Instrumentation – Block Diagram only and applications), ¹H NMR ((Principle and Instrumentation – Block Diagram only) – Chromatography – HPLC - Flame photometry – Estimation of sodium by Flame photometry.

TOTAL: 45 PERIODS**OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

- Identify the problems of hardness of water in boilers and to treat water by various methods.
- Construct electrochemical cell and apply Nernst equation for an electrochemical cell and identify various methods to control corrosion.
- Analyse the phase diagram of one component and two component system and describe the various methods of heat treatment of steel.
- Categorise the various types of fuels by their characteristics and analyse the flue gas by Orsat's method.
- Illustrate the working of lead acid battery, lithium ion battery and fuel cell.
- Describe the instrumentation and working of UV, IR, ¹HNMR, HPLC, and flame photometry.

TEXT BOOKS:

1. P.C. Jain and Monika Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) LTD, New Delhi, 2017
2. S.S Dara and S.S Umare, "A Text Book of Engineering Chemistry", S.Chand & Company Limited, 20th Edition, 2018.

REFERENCES:

1. Shashi Chawla, "A Textbook of Engineering Chemistry", Dhanpat Rai & CO. (PVT) LTD, New Delhi, 2012.
2. B.R. Puri, L.R. Sharma, M.S. Pathania, Vishal, "Principles of Physical Chemistry", Vishal Publishing Co., Punjab, 47th Edition, 2017.
3. G Palanna, "Engineering Chemistry", McGraw Hill Education (India) PVT, LTD, Chennai, 2017.
4. Dr. Sunita Rattan, "A Textbook of Engineering Chemistry", S.K.Kataria & Sons, New Delhi, 2012.

UNIT - V FILES, MODULES, PACKAGES**9**

Files and exception – text files, reading and writing files, format operator, command line arguments, errors and exceptions, handling exceptions, modules, packages – Math and Rand, Illustrative programs – word count, copy file, merge two files.

TOTAL: 45 PERIODS**OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

- Explain Components of a Computer System, types of programming languages, types of software with examples and purpose.
- Perform problem analysis, use algorithms and prepare flow charts, pseudo code for solving simple problems.
- Use Conditional, iteration constructs of python programming and apply to solve simple problems.
- Use Functions, recursive function, String functions in python programming and apply to perform linear and binary search.
- Explain the various operations for manipulating Tuples, Sets, Dictionaries and Use List to perform simple and sorting operations.
- Explain file handling operations, exception handling, modules and packages and illustrate programs for word count, file copy, merge operations and exception handling.

TEXT BOOKS:

1. E. Balagurusamy, “Problem solving and Python Programming”, First edition, McGraw Hill Education (India) Private Limited, 2017.
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016 (<http://greenteapress.com/wp/think-python/>)

REFERENCES:

1. Yashavant Kanetkar, Aditya Kanetkar, “Let Us Python”, 2nd Edition, BPB Publications, 2020.
2. John V Guttag, “Introduction to Computation and Programming Using Python: With Application to Understanding Data”, 2nd Edition, PHI Publisher, 2017.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
5. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3.6”, 3rd edition, Shroff/O’ Reilly Publishers, 2018.
6. Dr. A. Kannan, Dr. L. Sai Ramesh, “Problem Solving and Python Programming”, Updated Edition, United Global Publishers Pvt. Ltd., April 2018.

20BS1L1

BASIC SCIENCE LABORATORY

L	T	P	C
0	0	3	1.5

PHYSICS LABORATORY

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in Optics, properties of matter and liquids.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

LIST OF EXPERIMENTS

(Any five to be carried out & one demonstration experiment)

- Determination of Rigidity modulus – Torsional Pendulum.
- Determination of Young’s modulus – Non Uniform Bending.
- Determination of wavelength and particle size using diode laser.
 - Determination of acceptance angle in an optical fiber.
- Determination of velocity of sound and compressibility of liquid using ultrasonic interferometer.
- Determination of band gap of a semiconductor diode.
- Determination of thickness of a thin wire – Air wedge method.
- Determination of dispersive power of a prism – Spectrometer*
- Determination of wavelength of mercury spectrum – Spectrometer grating

*Demonstration experiment

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Evaluate moment of inertia of a disc and rigidity modulus for thin wire using Torsional pendulum.
- Appraise Young’s modulus of material of the given beam by Non-Uniform bending method.
- Measure the wavelength of laser light, Particle size and basic parameter of optical fiber using Semiconductor diode LASER.
- Estimate velocity of ultrasound and compressibility of liquid.
- Estimate the wavelength of the prominent spectral lines.
- Utilize experiment kits for useful applications.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No.	NAME OF THE EQUIPMENT	Qty.
1	Torsional pendulum set	6
2	Travelling microscope & accessories	6
3	Laser kit	6
4	Ultrasonic interferometer	6
5	Semiconductor band gap kit	6
6	Air wedge set up	6

7	Spectrometer & prism	6
8	Spectrometer & Grating	6

CHEMISTRY LABORATORY

OBJECTIVES:

- To make the students to acquire practical skill in the determination of water quality parameters through volumetric analysis.
- To have hands on experience in using instruments like pH meter, conductivity meter, potentiometer.
- To acquaint the students with the determination of molecular weight of polymer by viscometer.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

Any Five experiments to be given

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of dissolved oxygen content of water sample by Winkler's method.
4. Determination of strength of given hydrochloric acid using pH meter.
5. Estimation of iron content of the given solution using potentiometer.
6. Conductometric titration of a strong acid Vs a strong base.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
9. Corrosion Experiment – Weight Loss Method.
10. Estimation of sodium present in water using flame photometer.

TOTAL(Physics & Chemistry): 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Estimate the Chemical quality parameter of a water sample.
- Estimate the strength of acid by conductometric and pH metric titration.
- Estimate the strength of oxidisable material present in given sample by potentiometry.
- Determine the molecular weight of polymer by Ostwald viscometer.
- Demonstrate the rate of corrosion by weight loss method.

REFERENCE:

1. Vogel's "Text book of quantitative chemical analysis" (8th edition, 2014).

LIST OF APPARATUS AND EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No.	NAME OF THE EQUIPMENT	Qty.
1	Burette	30
2	Pipette	30
3	Beaker (100ml)	30
4	Conical Flask (250ml)	30
5	Conductivity meter	10
6	Potentiometer	10
7	pH meter	10
8	Viscometer	10
9	Flame Photometer	1
10	Electronic Balance	1

20GE1L1	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To write, test, and debug simple Python programs using conditional statements.
- To implement Python programs using loops.
- To use functions for structuring Python programs.
- To implement Python programs using lists.
- To write Python programs for implementing file operations.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

LIST OF PROGRAMS

1. Biggest of three numbers, odd or even number, Leap year.
2. GCD, Armstrong Number, Palindrome, Fibonacci Series, Prime number
3. Find the square root and exponentiation of a number with and without built-in functions
4. Linear search and Binary search using Recursion.
5. Find the maximum of a list of numbers
6. Selection sort, Insertion sort
7. First n prime numbers
8. Transpose of a Matrix
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Merge two files

PLATFORM NEEDED: Python 3 interpreter for Windows/Linux**TOTAL: 60 PERIODS****OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

- Develop simple Python programs using conditional and iterative constructs.
- Develop simple Python programs using built-in functions and user-defined functions.
- Develop a Python program using recursion to implement linear and binary search.
- Develop a Python program using list to implement selection and insertion sort.
- Develop Python programs to implement matrix operations.
- Develop a Python program to implement file handling.

20GE1L2	INDUSTRIAL PRACTICES WORKSHOP	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To provide exposure to the students with Hands on Experience on various Basic Industrial Practices in Civil, Mechanical, Electrical and Electronics Engineering.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

**GROUP A (CIVIL & MECHANICAL)
LIST OF EXPERIMENTS**

I CIVIL ENGINEERING PRACTICE

UNIT - I CARPENTRY PRACTICE

1. Study of carpentry tools.
2. Preparation of Cross lap joint
3. Preparation of Dovetail joint
4. Preparation of T joint

UNIT - II PLUMBING PRACTICE

1. Study of plumbing tools, pipeline joints, its location and functions: valves, taps, couplings, unions, reducers and elbows in household fittings.
2. Exercise on Preparation of plumbing line sketches for water supply and sewage works.
3. Exercise on providing of basic water line connection for a residential house using plumbing components.
4. Exercise on providing Water line pipe connections for household utilities like water heater, wash basin etc.,

II MECHANICAL ENGINEERING PRACTICE

UNIT - III SHEET METAL PRACTICE

1. Study of sheet metal forming tools.
2. Preparation of a Model of rectangular tray.
3. Preparation of a Model of Conical Funnel.

UNIT - IV MACHINING PRACTICE

1. Study of machining tools.
2. Exercise on Simple turning, Facing, Chamfering
3. Exercise on Taper turning.
4. Exercise on Drilling and Tapping.

UNIT – V METAL JOINING PROCESS

1. Study of welding tools.
2. Exercise to join two metal plates by single butt joint using arc welding.
3. Exercise to join two metal plates by T Fillet joint using arc welding.
4. Exercise to join two metal plates by lap joint using arc welding.

DEMONSTRATION

1. Gas welding process.
2. Refrigeration and Air conditioning process.

**GROUP B (ELECTRICAL & ELECTRONICS)
LIST OF EXPERIMENTS**

I ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, Fluorescent lamp and Energy Meter.
2. Measurement of Power consumption for CFL, Fluorescent Lamp, LED Lamp and Incandescent lamp.
3. Stair case wiring
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of an electrical equipment.

II ELECTRONICS ENGINEERING PRACTICE

1. Study of Electronic components – Resistor colour coding, Capacitor, Inductor- Measurement using LCR meter, Transistor & Diode – Terminal identification using Multimeter.
2. Study of logic gates AND, OR, EX-OR and NOT.
3. Measurement of AC signal parameter (peak-peak, rms value, period & frequency) using CRO and AFO.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 45 PERIODS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
CIVIL		
S. No	Component Name	No. of Components
1	Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, coupling, unions, elbows, plugs and other fittings	15 sets
2	Carpentry Vice (fitted to work bench)	15 nos
3	Standard wood working tools	15 sets
4	Models of industrial trusses, door joints, furniture joints	5 each
5	Power Tools a. Rotary Hammer b. Demolition Hammer c. Circular Saw d. Planer e. Hand Drilling Machine f. Jigsaw	2 nos 2 nos 2 nos 2 nos 2 nos 2 nos

MECHANICAL		
1	Arc welding transformer with cables and holders	5 nos
2	Welding booth with exhaust facility	5 nos
3	Welding accessories like welding shield, chipping hammer, wire brush, etc.	5 sets
4	Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.	2 nos
5	Centre Lathe	2 nos
6	Power Tool: Angle Grinder	2 nos
7	Study purpose items: Refrigerator and Air Conditioner	One each
ELECTRICAL		
1	Assorted electrical components for house wiring	10 sets
2	Electrical measuring instruments	10 sets
3	Study purpose items: Iron box, fan and regulator, emergency lamp	1 each
4	Megger (250V/500V)	1 no.
5	Power Tools a. Range Finder b. Digital Live-wire detector	2 nos 2 nos
ELECTRONICS		
1	Soldering guns	10 nos
2	Assorted electronic components for making circuits	50 nos
3	Small PCBs	10 nos
4	Multimeters	10 nos
5	Regulated of power supply, CRO	1 no. each

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Prepare different carpentry joints.
- Prepare pipe connections with different joints for domestic applications.
- Make the models using sheet metal works.
- Carry out the basic machining operations.
- Prepare joints using welding equipment's.
- Demonstrate on gas welding, refrigeration and air conditioning processes.
- Carry out basic home electrical works and appliances.
- Measure the electrical quantities.
- Elaborate on the components, gates, soldering practices.

20HS201	ADVANCED TECHNICAL COMMUNICATION	L	T	P	C
		3	0	0	3

OBJECTIVES:

- This course is designed for Engineering and Technology curriculum enabling the students to learn, acquire and apply updated elements of English communication.
- The course is aimed at providing effective skills for procuring communication skills for business and advanced technology.
- Students will benefit by learning the four skills – Listening, Speaking, Reading and Writing – to meet the global requirements for their career and higher studies.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT - I TECHNICAL WRITING 9

Listening: Listening to audio-visuals on personal Interviews, Speeches from Company CEOs, TV Debates. **Speaking:** Wishing, Greeting, Enquiring Hobbies. **Reading:** Editorials, Letter to the Editor Columns, Technical Papers. **Writing:** Analytical writings, Emphasis Techniques, Letter Writing – Business Correspondence, Abstract Writing, Common Errors, Footnotes, Compound words, Preparation of Agenda

UNIT - II BUSINESS ENGLISH AND LANGUAGE DEVELOPMENT 9

Listening: Listening to Audio-Visual documentary, TV Programs of Celebrities Forum. **Speaking:** Self-Expression, Introducing the fellow students, Talking about celebrities, leaders **Reading:** Company Correspondence, Business Correspondence, Technical Text for Vocabulary **Writing:** Bibliography, Sentence Completion, Cloze exercises, Verbal Analogy, Letter – Business enquiry orders, payments, Minutes Preparation.

UNIT - III VISUAL BASED LANGUAGE DEVELOPMENT 9

Listening: Visuals on Group Discussion-Understanding the nuances of GD – Approach – Content – Methodology. **Speaking:** Discussing main points on burning issues, Social issues – Expressing ideas and suggestions. **Reading:** Etiquettes of Non-Verbal Communication. **Writing:** List of common expressions for specified situations – Sentence linkers – Formal Expressions – Suggestions – Reported Speech - Letter to the Editor on Common Issues – Writing the Points in Indirect Form – Check Lists – Numerical Expression

UNIT - IV EMPLOYABILITY CORRESPONDENCE 9

Listening: Listening to Visuals of Technical Paper presentation – Technical and HR interviews **Speaking:** Peer-to-Peer Interview – Mock Interview – Telephone Conversations. **Reading:** Comparative Analyses – Instructions on Public Spots – Time Management concepts – Email Correspondence. **Writing:** Compare and Contrast – Cause and Effect – Purpose and Function – Job Application Letter – Drafting Resume / CV, – Inferring the graphical / Pictorial representations – Bar chart – Pie chart, Instruction – common and technical instructions for a process or a component

UNIT - V TECHNICAL REPORT WRITING**9**

Listening: Key note speeches – Annual Reports of institutions / companies. **Speaking:** Answering to the Mock Panel Interview – Sharing of interview experiences – presenting a Technical Paper. **Reading:** Annual Reports – Company Reports – Newspaper reports – Comprehension passages. **Writing:** Homophones – Abbreviations and Acronyms – SI Units – Report Writing with recommendations – Inferring the Graph – Flow Chart – Tables – Technical Papers

TOTAL: 45 PERIODS**OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

- Listen, Understand and create technical correspondence at advanced level
- Respond or answer to the contextual questions, interview questions, form instructions, draft reports
- Speak and analyze social issues, come out with effective ideas for discussion, understand the passages for meaning and vocabulary
- Assess error free technical writings, create legible and coherent technical papers, derive ideas of the given texts in a precise form
- Remember the updated elements of communication skills, nuances of non-verbal communication, business communication
- Create technical instructions, process instructions, self-appraisals, Resumes, reports on various situations

TEXT BOOKS:

1. Board of editors. "Fluency in English A Course book for Engineering and Technology". Orient Blackswan, Hyderabad: 2016
2. Raman, Meenakshi and Sharma, "Sangeetha- Technical Communication Principles and Practice". Oxford University Press: New Delhi, 2014.

REFERENCES:

1. Booth-L. Diana, "Project Work", Oxford University Press, Oxford: 2014
2. Grussendorf, Marion, "English for Presentations", Oxford University Press, Oxford: 2007
3. Means, L. Thomas and Elaine Langlois, "English & Communication For Colleges. Cengage Learning", USA: 2007
4. Board of Editor, "Advanced Technical Communication", Great Mind Publication, Chennai : 2019

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Understand the properties of Laplace transforms and to find the Laplace transform of some standard functions.
- Apply Laplace transform and inverse transform to solve the initial value problems.
- Solve the multiple integrals and apply the concept to find areas, volumes.
- Evaluation of line, surface and volume integrals using Green's, Gauss and Stokes theorems.
- Determine Analytic functions, Bilinear Transformations and apply the concept of conformal mapping to find the images of given curves.
- Evaluation of Contour Integrals using Cauchy's Integral and Residue theorems.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2017.
2. T. Veerarajan., "Engineering Mathematics I", The Tata Mc Graw Hill Publication-New Delhi, First Edition 2018.

REFERENCES:

1. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2006.
2. James Stewart, "Calculus, Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015.
3. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics II", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 9th Edition, 2014.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics II", Narosa Publications, New Delhi, 5th Edition, 2016.
5. Sastry, S.S. "Engineering Mathematics", Vol.I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.

20BS203	PHYSICS FOR ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce the essential physics of semiconductor device and electron transport properties.
- To inculcate proficiency in dielectric and optical properties of materials.
- To develop the knowledge on nano electronic devices.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT - I ELECTRICAL PROPERTIES OF MATERIALS 9

Classical free electron theory: Derivation of electrical conductivity and Thermal conductivity – Wiedemann-Franz law – Success and failures – Quantum free electron theory: Fermi–Dirac statistics – Density of energy states – Electron in periodic potential (Zone theory): Bloch theorem – Energy bands in solids – metals and insulators – tight binding approximation – Electron effective mass – concept of hole.

UNIT - II SEMICONDUCTOR PHYSICS 9

Properties of semiconductors – Energy band diagram – Direct and indirect semiconductors – Intrinsic Semiconductors – Carrier concentration (Derivation) – Variation of Fermi level with temperature – Extrinsic semiconductors – Carrier concentration in N-type & P-type semiconductors (qualitative) – Variation of Fermi level with temperature and carrier concentration – Carrier transport: drift and diffusion transport – Einstein’s relation – Hall effect and devices – Zener and avalanche breakdown in p-n junctions – Ohmic contacts – tunnel diode – Schottky diode – MOS capacitor.

UNIT - III DIELECTRIC MATERIALS 9

Basic definitions – polarization processes – Frequency and temperature dependence of polarization – Internal field – Clausius-mosotti relation (derivation) – Dielectric constant experiment – Relation between dielectric constant and Refractive index – dielectric loss – dielectric breakdown – High K dielectric – applications of dielectric (capacitor, transformer) – Ferro electricity and its applications.

UNIT - IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – carrier generation and recombination processes – absorption, emission and scattering of light in metals, insulators and semiconductors (concepts only) - photocurrent in a p-n diode – Photo voltaic effect – solar cell and its types – LCD – LED – Organic LED – Laser diodes – Exaction – quantum confined stark effect.

UNIT - V NANO ELECTRONIC DEVICES**9**

Quantum structures, Quantum confinement – Density of states in quantum well, quantum wire and quantum dot structures(qualitative) – Band gap of nanomaterials – Quantum size effect – Size dependence of fermi energy – Quantum dot laser – Coulomb blockade effect – single electron transistor (SET) – Magnetic semiconductor – Carbon nanotubes: types, properties and applications.

TOTAL: 45 PERIODS**OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

- Differentiate classical, quantum electron theories and energy band theory.
- Discuss the properties of semiconductors with applications of the p-n junction and diodes.
- Explain dielectric properties of materials.
- Classify optical materials for Opto – electronic applications.
- Clarify the basic operations of p-n junction devices like solar cells, LED, LCD etc.
- Explain different quantum structures, size effect and carbon nanotubes.

TEXT BOOKS:

1. B.K.Pandey and S.Chaturvedi, “Engineering Physics”, Cengage learning, 2013.
2. V.Rajendran, “Engineering Physics”, Tata Mc Graw-Hill Education, 2011.
3. Charles Kittel, “Introduction to solid state Physics”, John Wiley & sons, 8th edition, 2015.

REFERENCES:

1. G.W. Hanson, “Fundamentals of nano electronics”, Pearson Education, 2009
2. B. Rogers, Adams and S. Pennathur, “Nanotechnology: Understanding Small Systems”, CRC Press, 2019.
3. N. Garcia and A. Damask, “Physics for Computer Science Students”, Springer Verlag, 2012.

20EC201

NETWORK ANALYSIS

L	T	P	C
3	1	0	4

OBJECTIVES:

- To study the basic laws on Circuits and to calculate the voltage and current in circuit using basic theorems.
- To apply the concept of transients and resonance in series and parallel circuit
- To explore two port networks and analyze different types of two port network.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT - I BASIC NETWORK ANALYSIS AND NETWORK TOPOLOGY 12

Basic Circuit Analysis: Ohm's Law – Kirchhoff's laws – Mesh current and node voltage method of analysis for D.C and A.C. circuits , voltage and current division, source transformation – star delta conversion. **Network topology:** Network topology matrices associated with graphs; incidence, fundamental cut set and fundamental circuit matrices.

UNIT - II NETWORK THEOREMS FOR DC AND AC CIRCUITS 12

Network Theorems: Superposition theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Maximum power transfer theorem, Duality and dual networks.

UNIT - III RESONANCE AND COUPLED CIRCUITS 12

Resonance: Series resonance - Parallel resonance - Variation of impedance with frequency - Variation in current through and voltage across L and C with frequency – Bandwidth - Q factor - Selectivity. **Coupled Circuits:** Self inductance - Mutual inductance - Dot rule - Coefficient of coupling - Analysis of multi-winding coupled circuits - Series, Parallel connection of coupled inductors - Single tuned and double tuned coupled circuits.

UNIT - IV TRANSIENT ANALYSIS FOR DC AND AC CIRCUITS 12

Transient Analysis: Natural response-Forced response - Transient response of RC, RL and RLC circuits to excitation by Step Signal, Impulse Signal and exponential sources - Complete response of RC, RL and RLC Circuits to sinusoidal excitation.

UNIT - V TWO PORT NETWORKS PARAMETER 12

Two port networks: Z parameters, Y parameters, Transmission (ABCD) parameters, Hybrid(H) Parameters, Interconnection of two port networks, Symmetrical properties of T and π networks

TOTAL: 60 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Apply Kirchoff's law for AC & DC circuits.
- Apply basic laws in Network topology.
- Apply network theorems to AC & DC circuits.
- Understand the concepts of resonance & coupled circuit.
- Analyze transient response for AC & DC circuits.
- Apply the properties of Two port networks in an electrical circuit.

TEXT BOOKS:

1. A Sudhakar, S Shyammohan and Palli, "Circuits and Network Analysis and synthesis Tata McGraw-Hill", 2015.
2. William H. Hayt, Jr. Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", McGraw Hill Science Engineering", Eighth Edition, 11th Reprint 2016.

REFERENCES:

1. Joseph Edminister and Mahmood Nahvi, "Electric Circuits, Schaum's Outline Series, Tata McGraw Hill Publishing Company", New Delhi, Fifth Edition Reprint 2016.
2. L Robert Boylested, "Experiments in Circuit Analysis to Accompany Introductory Circuit Analysis", PHI, 2002.
3. M.Russell, Mersereau and Joel R. Jackson, "Circuit Analysis- A System Approach", Pearson Education, 2009.
4. Steven T. Karris, "Circuit Analysis I with MATLAB Applications", Orchard Publications, 2004.

20GE204	BASIC ELECTRICAL ENGINEERING AND ELECTRON DEVICES	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the operation of Electrical Machines
- To learn the working principle and circuit model of Static Devices
- To study about the concepts of semiconductor devices such as PN diode, Bipolar and Field effect transistor and some special semiconductor devices.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

UNIT- I DC MACHINES 9

Introduction –Constructional features-Motoring and Generation principle-EMF and Torque equation-Circuit model-Methods of Excitation and Magnetization characteristics-starting and speed control.

UNIT - II AC MACHINES 9

Principle of operation of three-phase induction motors- Construction-Types –Equivalent circuit-single phase induction motors-Construction –types –starting and speed control methods-Alternator-working principle-equation of induced EMF-voltage regulation, synchronous motors-working principle-starting methods-Torque equation-stepper motors.

UNIT-III TRANSFORMER 9

Introduction-Ideal transformer-Accounting for finite Permeability and core loss-circuit model of transformer-Determination of parameter of circuit model of transformer-Voltage Regulation- efficiency-Three Phase transformers-Auto transformers.

UNIT- IV SEMICONDUCTOR DIODE AND SPECIAL DEVICES 9

PN junction diode, Current equations, Switching Characteristics, Breakdown in PN Junction Diodes- Varactor diode – Metal-Semiconductor Junction- MESFET- UJT, SCR, Diac, Triac.

UNIT-V TRANSISTORS 9

NPN -PNP -Operations-Early effect-Current equations – Input and Output characteristics of CE, CB, CC - h-parameter model- JFETs – Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation, D-MOSFET, E-MOSFET- Characteristics – Comparison of MOSFET with JFET.

TOTAL: 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Demonstrate the principle of operation, starting and speed control of D.C machines.
- Describe the construction , principle of operation and performance of A.C machines
- Explain the operation and circuit model of transformer.
- Describe the theory, construction and operation of semiconductor diode and special Electronic Devices.
- Explain the concepts and working of Bipolar Junction Transistors.
- Explain the concepts and working of Field effect Transistors such as JFET and MOSFET.

TEXT BOOKS:

1. D P Kothari and I.J Nagarath, “Basic Electrical and Electronics Engineering”, McGraw Hill Education (India) Private Limited, 4th Edition, 2019.
2. S Salivahanan, N Suresh Kumar, “Electronic Devices and Circuits”, McGraw Hill Education (India) Private Limited, 4th Edition, 2012.

REFERENCES:

1. S.K.Bhattacharya “Basic Electrical and Electronics Engineering”, Pearson India, 2011.
2. Mittle N., “Basic Electrical and Electronics Engineering”, Tata McGraw Hill, 24th Reprint, 2016.
3. Donald A Neamen and Dhruves Biswas “Semiconductor Physics and Devices”, McGraw Hill Education (India) Private Limited, 4th Edition, 2012.
4. Robert Boylestad and Louis Nashelsky., “Electron Device and Circuit Theory” Pearson Prentice Hall, 10th edition, 2008.

20GE201

ENGINEERING GRAPHICS

L	T	P	C
2	0	2	3

OBJECTIVES:

- To develop graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose national standards related to technical drawings.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT - I PROJECTION OF POINTS AND LINES 6+6

Orthographic projection – Principles - Principal planes - Projection of points in all quadrants - Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method.

UNIT - II PROJECTION OF PLANE SURFACES 6+6

Projection of planes (Polygonal and Circular surfaces) inclined to both the principal planes by rotating object method.

UNIT - III PROJECTION OF SOLIDS 6+6

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

UNIT - IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 6+6

Sectioning of simple solids in vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other – obtaining true shape of section - Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinder and cone.

UNIT - V ISOMETRIC PROJECTION AND FREEHAND SKETCHING 6+6

Principles of Isometric Projection – Isometric scale – Isometric projections of simple solids - truncated Prisms and Pyramids. Visualization concepts and Free Hand sketching : Principles – Representation of Three Dimensional objects – Layout of views - Freehand sketching of multiple views from pictorial views of objects

TOTAL: 60 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Familiarize with the fundamentals and standards of Engineering graphics.
- Draw the orthographic projections of points, lines and planes.
- Draw the projections of simple solids like prisms, pyramids, cylinder and cone.
- Draw the projections of sectional views of solids and develop its lateral surfaces.
- Draw the isometric projection of simple objects, truncated prism and pyramids.
- Draw the free hand sketching of simple objects.

TEXT BOOKS:

1. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 30th Edition, 2017.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 15th Edition, 2018.

REFERENCES:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education, 3rd Edition, 2012.

PUBLICATION OF BUREAU OF INDIAN STANDARDS:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001: Technical drawings - General principles of presentation.
4. IS 11669 – 1986: General principles of dimensioning on technical drawings.
5. SP 46 (2003): Engineering Drawing Practice for Colleges.
6. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

SPECIAL POINTS APPLICABLE TO EXAMINATIONS ON ENGINEERING GRAPHICS:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.

20GE2L2	UNIX AND SHELL SCRIPTING LABORATORY	L	T	P	C
		1	0	2	2

OBJECTIVES:

- To understand the key features of UNIX
- To familiar with various UNIX commands.
- To understand the concepts of Shell programming.
- To familiarize with 'vi' editor.
- To acquire basic 'C' programming skills.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

LIST OF PROGRAMS

1. Study of UNIX OS, UNIX Architecture, Features of UNIX, Types of Shells.
2. General purpose utilities commands - cal, date, echo, printf, bc, tty, uname
3. Directory related commands – pwd, cd, mkdir, rmdir
4. Files related commands – cat, cp, rm, mv, more, file, wc, cmp, ls, chmod
5. Filtering commands – head, tail, sort, cut, paste, uniq, tr, grep
6. Shell programming – read and echo, conditional statements – if –then-fi, it-then-else-fi, test, nested if-elses, case structure.
7. Shell Programming – Loop Control Structure – while, until, for, break, continue
8. Simple C Programs in 'vi' editor.
9. C Programs using Conditional Statements – Finding Odd or Even, Biggest among three numbers, Finding the number is prime or not,
10. C Programs using Conditional Statements – Reverse the number, Arithmetic operations using switch - case.
11. C Programs using Looping Statements – Factorial of n numbers, Checking Armstrong Number or Not.
12. C Programs using Looping Statements – Fibonacci Series, Printing number of uppercase and lowercase letter.
13. C Programs using Command Line Arguments – Biggest Among three numbers
14. C Programs using Arrays – Finding the largest & smallest number in the given array, Sorting Arrays.
15. C Programs using Arrays – Addition and Subtraction of two matrices.

PLATFORM NEEDED: Unix Operating System / any flavor of Linux and C Compiler

TOTAL: 15 + 30 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Demonstrate the various General purpose utilities, Directory, Files and Filtering commands.
- Develop simple shell programs using conditional and looping constructs.
- Develop simple C programs in 'vi' editor using conditional and looping statements.
- Develop simple C programs in 'vi' editor using command line arguments.
- Develop C programs in 'vi' editor for sorting a given set of numbers.
- Develop C programs in 'vi' editor to perform matrix addition, subtraction.

20EC2L1	CIRCUITS AND DEVICES LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To gain hands on experience in KVL & KCL & Various Theorems .
- To learn the characteristics of basic electronic devices such as Diode, BJT,FET, SCR.
- To understand the working of RL, RC and RLC circuits.

PRE-REQUISITE:

Course Code: Nil

Course Name: Nil

LIST OF EXPERIMENTS:

1. Verification of KVL & KCL
2. Verification of Super Position Theorem
3. Verification of Thevenin & Norton theorem
4. Verification of maximum power transfer & reciprocity theorem
5. Determination of Resonance Frequency of Series & Parallel RLC Circuits
6. Transient analysis of RL and RC circuits
7. Characteristics of PN Junction Diode and Zener diode
8. Common Emitter input-output Characteristics
9. Common Base input-output Characteristics
10. FET and UJT Characteristics
11. SCR Characteristics
12. Clipper, Clamper and Full Wave Rectifier circuits

LABORATORY REQUIREMENTS

1. BC 107, BC 148, 2N2646, BFW10 – 25 each
2. 1N4007, Inductors – sufficient quantities
3. Bread Boards – 15 Nos
4. CRO (30MHz) – 10 Nos.
5. Function Generators (3MHz) – 10 Nos.
6. Dual Regulated Power Supplies (0 – 30V) – 10 Nos.

TOTAL: 60 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Experimentally verify various Theorems
- Determine the resonant frequency, quality factor & bandwidth of the RLC circuits
- Perform the transient analysis of RL and RC circuits
- Analyze the V-I characteristics of PN diode and its use in rectifier circuits.
- Analyze Input-Output characteristics of BJT.
- Analyze the V-I Characteristics of FET, UJT & SCR.